

BOIS D' ARC CREEK BASIN

SECTION 905(b) (WRDA 86) Analysis

1. STUDY AUTHORITY

a. This Section 905(b) (WRDA 86) Analysis was prepared as an initial response to the Energy and Water Development Act, 2000, Public Law 106-60, and House Committee on Appropriations Report 106-253, dated July 23, 1999, which reads in part:

".....Funds are included in the recommendation for a reconnaissance study of flooding and related water resource problems along the Bois d' Arc Creek near Bonham, Texas."

b. Funds in the amount of \$100,000 were appropriated in Fiscal Year 2000 to conduct the reconnaissance phase of the Bois d' Arc Creek near Bonham, Texas, study. In response to the study authority, the reconnaissance phase of the study was initiated on January 17, 2000.

2. STUDY PURPOSE

The purpose of this study is to determine if there is Federal interest in providing flood control, water supply, recreation, and fish and wildlife improvements within the Bois D' Arc Creek Basin near Bonham, Texas. If Federal interest is determined, a feasibility report will be forwarded to Congress with a recommendation for authorization. This reconnaissance phase of the study has resulted in the finding that there is Federal interest in continuing the study into the feasibility phase. This Section 905(b) (WRDA 86) Analysis documents the basis for this finding and establishes the scope of the feasibility phase. As the document that establishes the scope of the feasibility study, this Section 905(b) (WRDA 86) Analysis is the basis for the Scope of Work chapter of the Project Study Plan.

3. LOCATION OF PROJECT/CONGRESSIONAL DISTRICTS

a. The Bois d' Arc Creek Basin is located in northeastern Texas in Fannin and Grayson counties. Bois d' Arc Creek originates at the western border of Grayson County and flows northeasterly through Fannin County to its confluence with the Red River. See Attachment 1. Fannin County, Texas, is the non-Federal sponsor for the feasibility phase of this study.

b. Congressional interests includes Texas Senators Phil Gramm and Kay Bailey Hutchison and Congressman Ralph Hall of the Texas 4th Congressional District.

4. PRIOR STUDIES, REPORTS, AND EXISTING WATER PROJECTS

The following reports were reviewed as a part of this study:

a. 1968 Reconnaissance Report, Bonham Lake, Texas. This report, prepared by the Tulsa District, identified a feasible multipurpose lake for potential development. Data from this report are the basis for the project formulated in this reconnaissance report.

b. Red River Basin, Arkansas, Texas, Louisiana, and Oklahoma Comprehensive Study, Interagency Reconnaissance Report, March 1985. This report identified a number of potential lake sites that were considered in development of water supply within the northeastern Texas region, including Fannin County.

5. PLAN FORMULATION

During a study, the six planning steps set forth in the Water Resource Council's Principles and Guidelines are repeated to focus the planning effort and eventually to select and recommend a plan for authorization. The six planning steps are: (1) specify problems and opportunities, (2) inventory and forecast conditions, (3) formulate alternative plans, (4) evaluate effects of alternative plans, (5) compare alternative plans, and (6) select recommended plan. The phases of the planning process typically differ in the emphasis that is placed on each step. In the iterations conducted during the reconnaissance phase, the step of specifying problems and opportunities is emphasized, although the other steps are not ignored since the initial screening of preliminary plans that results from the other steps is critical to scoping follow-on feasibility phase studies. The subparagraphs that follow present the results of the reconnaissance phase. This information will be refined in future iterations of the planning steps during the feasibility phase.

a. Problems and Opportunities

(1) Existing conditions. Bois d' Arc Creek rises in the eastern portion of Grayson County near Whitewright, Texas, and flows in a northeasterly direction across Fannin County to enter the right bank of the Red River at mile 611.8. The watershed has a length of about 58 miles, a maximum width of about 18 miles, and a drainage area of about 425 square miles. According to State estimates of the 1999 population, Fannin County had 28,700 residents, a population larger than its 1990 census count of 24,804. The City of Bonham is the largest city in Fannin County and had an estimated population of 7,500. The residents of Fannin County are primarily low to middle income, with a median family income of \$26,600 in 1990, the most recent data on family income for the area. The median family income for all residents in Texas was \$31,553. The per capita income in Fannin County was \$9,509 compared to the State per capita income of \$12,904. Manufacturing and retail trade are the two largest employing industries in the county. The average 1999 unemployment rate in Fannin County of 5.3% is slightly higher than the State of Texas rate of 4.6% for the same year. In 1927, local interests organized three drainage districts, and the upper two-thirds Bois d' Arc Creek was modified through construction of a straight channel. Overflows from the natural and modified portions of

Bois d' Arc Creek pose threats to urban development in the City of Bonham and surrounding agricultural areas within the basin.

(2) Flood problem. The Bois d' Arc Creek floodplain and its tributaries have been associated with flooding of residential and commercial structures in and near the town of Bonham, Texas. Recent flooding occurred along Bois d' Arc Creek and in the City of Bonham in October 1981, May 1989, and January 1998. The most significant flooding from available records occurred in 1989 when flood rescue operations for a number of Bonham residents took place. The Bonham floodplain administrator indicated that at least 100 homes were flooded by the event. In addition, flooding from Bois d' Arc Creek damaged agricultural crops and equipment. Flood control measures of a Federal project will primarily impact areas of the City of Bonham and Fannin County, Texas.

(3) Water supply. Officials of the City of Bonham and Fannin County, Texas, have projected a need for additional water supply within the region by the year 2014. Additional water supplies in the Bois d' Arc Creek Basin would provide benefits to the northeastern Texas region.

(4) Recreation. Fannin County officials have indicated that a multipurpose project could provide additional recreational facilities that are desired by area residents. The population in Fannin County has been projected to grow 36% from 2000 to the year 2050. In addition, significant population increases that include the Dallas metroplex will place pressure for new and expanded recreation facilities in the region.

(5) Ecosystem restoration. An opportunity exists to provide ecosystem restoration features along Bois d' Arc Creek. Historical wetlands within the basin have been adversely affected by modifications to the original Bois d' Arc channel. Water releases from a multipurpose lake project would provide flows beneficial to some 3,000 acres of wetlands in the lower portion of the basin. The Bois d' Arc Creek Basin has suffered declines and impacts to bottomland hardwood forests and riparian vegetation as have other areas within the state. Vegetation along the stream has been removed, and the land has been converted to grasslands, improved pasture, and agricultural lands. The decline in this habitat type has led to preservation and restoration efforts by a number of entities within the state and by the U.S. Fish and Wildlife Service. Within the Bois d' Arc Creek Basin, these wetland resources would probably be classified as Resource Category II, which connotes high value for species and the habitat as scarce or becoming scarce. At least one area, the Caddo National Forest and Grassland, exists in the lower basin and is managed by the U.S. Forest Service.

(a) Bottomland hardwoods and riparian vegetation are critical for habitat diversity and maintenance of wildlife species. Numerous species utilize these habitats, including turkey, whitetail deer, furbearers, waterfowl, songbirds, and various species of small mammals, birds, amphibians, and reptiles. Species of special concern (Texas Parks and Wildlife Threatened and Endangered Species) that are known to occur or have a high probability of occurring in the Bois d' Arc Creek Basin include the bald eagle, Interior least tern, Eskimo curlew, red-cockaded woodpecker, paddlefish, American swallow-tailed kite, white-faced ibis, wood stork, Arctic peregrine falcon, and Texas horned lizard.

(b) The Bois d' Arc Creek watershed has been modified by agricultural practices. The riparian corridor along the creek has been severely reduced and floodplain wetlands converted to farmland. The loss of stream bank vegetation has contributed to siltation within the stream, bank caving, and elevated stream temperatures, and has reduced the carrying capacity of the aquatic ecosystem. An aquatic habitat restoration project that would restore the riparian corridor along the stream would provide multiple benefits to the aquatic ecosystem of the creek. Protected bottomland hardwood tree and native grass plantings along the stream would restore lost or degraded aquatic habitat, reduce siltation, and provide a travel corridor for wildlife species along the stream to the Red River. Wildlife species likely to benefit from a habitat restoration project would include turkey, whitetail deer, wood duck, various species of amphibians, reptiles, and songbirds. Improved stream water quality, reduced siltation, and reduced stream temperatures would benefit the aquatic community as well. Species most likely to benefit would include largemouth bass, various species of sunfish, channel and flathead catfish, the minnow community, and some species of darters. It could also positively impact fish species of special concern such as the blue sucker, American eel, and paddlefish, especially in the lower reaches of the stream near its confluence with the Red River.

b. Inventory and Forecast Conditions

(1) Inventory. Data formulated for the 1968 reconnaissance report, including summaries of damages and costs for the alternatives considered, were the basis for a justified project in the Bois d' Arc Creek Basin. These data were updated to reflect expected costs and benefits for the basin in its current state of development. No additional structural inventory or hydrology was generated. Although there is evidence of additional development and potentially higher values for specific agricultural products, the more conservative cost and benefit values for the 1968 conditions were updated.

(2) Expected future conditions. The State of Texas projects that the Fannin County population will be 41,000 in the year 2050. This growth is linked to overall economic development in northeast Texas as employment opportunities in retail, services, and manufacturing continue to expand. Associated with this growth will be demand for water supply and recreation. In the absence of a project to address the flood control, water supply, and recreation needs of the area, continued growth and regional development would be limited. Flood damages within the Bois d' Arc Creek Basin would continue to occur and threaten the safety of residents and cause loss to property, agricultural products, and equipment.

c. Formulate Alternative Plans

(1) Planning objectives and constraints. The national or Federal objective of water and related land resources planning is to contribute to national economic development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements.

(a) Contributions to NED are increases in the net value of the national output of goods and services expressed in monetary units and are the direct net benefits that accrue in the planning area and the rest of the Nation.

(b) The Corps has added a second objective for National Ecosystem Restoration (NER) in response to legislation and administration policy. This objective is to contribute to the Nation's ecosystems through ecosystem restoration, with contributions measured by changes in the amounts and values of habitat.

(2) Public concerns. A number of public concerns were identified during the reconnaissance study. Input was received through coordination with the potential sponsor, Fannin County and some initial coordination with City of Bonham officials. Public concerns that are related to establishing planning objectives and planning constraints are:

(a) Recent flood events in and near the City of Bonham from Bois d' Arc Creek and its tributaries have created concern among area residents and government officials for reduction of potential damages.

(b) Growth in commercial and industrial activity in the City of Bonham and in the Fannin County area in recent years has resulted in the need for permanent additional water supply to accommodate future growth within the region. Projections by the Texas Water Development Board, 2002 State Water Plan, indicate a population growth in Region C (which includes Fannin County) of about 65% from 1990 to the year 2050. Projections of water demand for the same period in Texas Region C indicate an increase of 150% over current use.

(c) Recreational opportunity is limited in Fannin County. Area residents consider the potential for increased multipurpose recreation to be a benefit.

(d) Bottomland environmental resources located along Bois d' Arc Creek include unique natural wetlands that are subject to periods of drought during the year. The potential exists for project features to augment flow conditions within the lower portions of the basin to restore riparian and aquatic ecosystems that have been lost from historical modifications of Bois d' Arc Creek.

(3) Study planning objectives. The objectives of NED and NER are general statements and are not specific enough for direct use in plan formulation. The water and related land resource problems and opportunities identified in this study are stated as specific planning objectives to provide focus for the formulation of alternatives. Planning objectives reflect the problems and opportunities and represent desired positive changes in the without-project conditions. The planning objectives are specified as follows:

(a) Reduce existing flood related damages in the Bois d' Arc Creek Basin in Fannin County, Texas.

(b) Provide additional municipal and industrial water supply for the northern Texas region, including municipalities and other users in Fannin County.

(c) Provide recreation opportunities for residents and visitors to the northeastern Texas region.

(d) Restore the riparian ecosystem in the lower basin of Bois d' Arc Creek to a more naturally functioning system.

(e) Minimize real estate acquired for any project considered for development.

(f) Identify alternatives that meet local acceptability criteria.

(4) Planning constraints. Unlike planning objectives that represent desired positive changes, planning constraints represent restrictions that should not be violated. The planning constraints identified in this study are as follows:

(a) Any recommended project must be justified under established Federal planning criteria.

(b) Federal participation in the recommended plan is limited to 65% of the implementation cost, unless Congress specifically authorizes participation at another rate. Amounts over the Federal limit would be a local expense.

(c) The recommended project must be acceptable and supported by a local sponsor. Feasibility studies must be cost shared 50%. Separable allocated costs for construction will be determined in the feasibility phase.

(5) Problems warranting Federal participation. The problem identified in the Bois d' Arc Creek watershed is significant risk of flood damage to urban areas of the City of Bonham and flooding of agricultural areas northeast of the city. Ecosystem restoration opportunities exist in the lower portions of Bois d' Arc Creek Basin, which contain large wetland resources.

d. Effects of Alternative Plans

(1) A variety of measures were considered. Some were found to be infeasible due to technical, economic, or environmental constraints. Each measure was assessed and a determination made regarding whether it should be retained in the formulation of alternative plans. Descriptions and results from evaluating the measures considered in this study are presented below:

(a) No Action. The Corps is required to consider "No Action" as an alternative to comply with requirements of the National Environmental Policy Act. No Action is the condition reasonably expected to prevail over the period of analysis given current conditions and trends and assuming that no project would be implemented by the Federal Government to achieve the planning objectives. No Action, which is synonymous with the Without-Project Condition, forms the basis from which all other alternative plans are measured.

(b) Nonstructural measures. Nonstructural plans included flood proofing and relocation of structures subject to flood damage.

(c) Structural measures. Several structural measures were considered in the 1968 reconnaissance report. One alternative considered was channel improvement at Bois d' Arc Creek and its tributaries. The measures were directed at improvement of the flood control problem only. Reservoirs that could provide multipurpose benefits within the basin included sites at river miles 23.5, 24.8, 28.6, and 43.1.

e. Comparison of Alternative Plans

(1) Preliminary plans eliminated from further consideration. Preliminary plans are composed of one or more management measures that remain after initial screening. These plans and results of their evaluations are given below:

(a) Nonstructural plans were not economically justified, practical, or locally acceptable for application within Fannin County. In addition, no nonstructural measures were identified that met all water resource needs within the basin.

(b) Because of the diverse water resource needs within the Bois d' Arc Creek Basin, structural measures were formulated based on locating a multipurpose reservoir that could provide flood control, water supply, recreation, and fish and wildlife. Reservoir sites located at lower river miles 23.5, 24.8, and 28.6 were dropped from further consideration in the reconnaissance phase. Reservoir sites in the lower portion of the basin were eliminated primarily because of the lack of effective flood control and potential technical and environmental problems associated with locating reservoirs in wetland areas in the lower Bois d' Arc Creek Basin. The best location for a reservoir in the lower portion of the basin, at river mile 23.5 (Coffey Mill site), would inundate an existing Forest Service lake and significant wetland areas. In addition, the shallow nature of the reservoir would potentially pose water quality problems.

(c) Combinations of upstream reservoirs and channel modifications were considered as potential solutions to the flood control needs within the Bois d' Arc Creek Basin. One alternative included locating a small reservoir on the Powder Creek tributary of Bois d' Arc Creek in combination with channel clearing and widening on Powder Creek and Bois d' Arc Creek channels. These plans were found to not be economically justified. In addition, the smaller detention reservoir would not provide significant water supply yield. Consequently, these combination plans were eliminated from further consideration.

(2) Preliminary plans remaining for further consideration. Descriptions and results from evaluating the preliminary plans considered further in this study are presented below:

(a) No Action. The No Action plan was carried further into the evaluation. However, the plan would not satisfy the planning objectives to reduce flood damages along Bois d' Arc Creek or provide water supply, recreation, and fish and wildlife benefits.

(b) Multipurpose Reservoir. Using the results of the 1968 Tulsa District reconnaissance report, a preliminary plan was identified that included construction of a multipurpose reservoir at the Bonham site (mile 43.1) located upstream from the City of Bonham. This reservoir would provide flood reduction benefits, 27 million gallons per day of water supply, opportunities for recreation, and potential fish and wildlife benefits. Ecosystem restoration benefits within the Bois d' Arc Creek Basin from water releases from the Bonham Reservoir to historical wetlands downstream were also considered.

(3) Preliminary evaluation of alternatives. With the No Action plan, expected annual flood damages of about \$808,000 were estimated within the 100-year floodplain. Updating the 1968 Bois d' Arc reconnaissance report derived this estimate of loss. It is likely these damage amounts are understated due to construction of additional structures, higher value cropping patterns, and intensified farming practices that have developed within the 100-year floodplain since 1967. In consideration of these increased values, a complete inventory of annual flood damages could range from \$800,000 to \$1,500,000. Projections of net water supply needs indicate a deficit beginning in the year 2014. To address this need, another reservoir site in the lower portion of the Bois d' Arc Basin named the "New Bonham" site was proposed in the 2000 Texas Water Plan for Region C. Construction of this reservoir was estimated to cost \$191 million. This site was used to estimate benefits for the Federal project located at river mile 43.1 that includes water supply as the least costly water supply alternative. The Federal multipurpose reservoir alternative is estimated to cost in the range of \$90 million, or \$7,540,000 in average annual costs (100 years, 6-5/8%).

Average annual benefits of \$10,020,000 were estimated for the preliminary plan. This estimate includes annual benefits for flood damage reduction, water supply, recreation, and fish and wildlife. The estimated benefit-to-cost ratio (BCR) would meet the Federal criterion of a BCR of at least 1.

f. Recommended Plan

The multipurpose Bonham Reservoir located at river mile 43.1 is the recommended plan.

6. FEDERAL INTEREST

Based on the preliminary screening of alternatives, an alternative can be developed to address flood control, water supply, recreation, and fish and wildlife needs in an economically justified, environmentally acceptable manner in the feasibility phase. Flood control is an output with a high budget priority; therefore, there is Federal interest in conducting the feasibility study. In addition, the potential for low flow augmentation to wetland areas below the proposed reservoir would improve native ecosystem habitat as part of an ecosystem restoration project that could be developed within existing policy.

7. PRELIMINARY FINANCIAL ANALYSIS

As the non-Federal sponsor, Fannin County, Texas would be required to provide 50% of the cost of the feasibility phase. A letter of intent from the local sponsor is included as Attachment 2. The letter states their willingness to enter into negotiations for the feasibility phase, their ability to pursue the feasibility study and share in its cost, and their understanding that cost sharing at a minimum of 35%, including the LERRD's, is also required for construction of the potential project.

8. SUMMARY OF FEASIBILITY STUDY ASSUMPTIONS AND EXCEPTIONS

- a. Mapping and imagery of topographic wetlands and agricultural features are available and sufficient for field investigations. Mapping for design purposes will be acquired.
- b. An Environmental Impact Statement will be necessary. Cultural surveys will be required. Costs for a cultural inventory may be reduced based on coordination of available data and a reduced scope of survey.
- c. The cost estimate assumes no problems with hazardous, toxic, and radiological, waste (HTRW) materials. An initial site assessment will be performed to determine the potential risk for HTRW.
- d. The study schedule assumes the sponsor fully supports the schedule.
- e. The real estate estimate for LERRD's will be based on a gross appraisal. The detailed Real Estate Design Memo will be part of the plans and specifications phase.
- f. The feasibility report will be produced on paper. A CD-ROM will be produced to include the report and appendices.

9. FEASIBILITY PHASE MILESTONES

| Milestone | Description | Duration (months) | Cumulative (months) |
|-----------|---|-------------------|---------------------|
| 1 | Initiate Study | 0 | 0 |
| 2 | Public Workshop #1 (scoping) | 2 | 2 |
| 3 | Feasibility Scoping Meeting | 8 | 10 |
| 4 | In Progress Review | 12 | 22 |
| 5 | Alternative Formulation Briefing | 12 | 34 |
| 6 | Draft Feasibility Report | 4 | 38 |
| 7 | Final Pubic Meeting | 1 | 39 |
| 8 | Feasibility Review Conference (if needed) | 1 | 40 |
| 9 | Policy Compliance Review incl. ITR | 1 | 41 |
| 10 | Final Report to Division | 3 | 44 |
| 11 | DE's Public Notice | 1 | 45 |
| - | Chief's Report | 6 | 51 |
| - | Completion | 4 | 55 |

10. FEASIBILITY PHASE COST ESTIMATE

| Major Work Items | Federal | Local Sponsor | | Total |
|---|-----------|---------------|----------|-------------|
| | | Cash | In-Kind | |
| Public Involvement | \$ 15,000 | \$ 10,000 | \$ 5,000 | \$ 30,000 |
| Environmental Studies | \$130,000 | \$130,000 | | \$260,000 |
| Economic Studies | \$ 20,000 | \$ 20,000 | | \$ 40,000 |
| Project Management (5%) | \$ 12,000 | \$ 0 | \$12,000 | \$ 24,000 |
| Plan Formulation | \$ 50,000 | \$ 50,000 | | \$100,000 |
| Engineering/Design | \$300,000 | \$280,000 | \$10,000 | \$600,000 |
| Real Estate Studies | \$ 25,000 | \$ 20,000 | \$ 5,000 | \$ 50,000 |
| Report Preparation | \$ 18,000 | \$ 18,000 | | \$ 36,000 |
| Washington Level Review Contingency (5%) | \$ 25,000 | \$ 25,000 | | \$ 50,000 |
| Study Contingency (15%) | \$ 75,000 | \$ 75,000 | | \$150,000 |
| Total | \$670,000 | \$638,000 | \$32,000 | \$1,340,000 |

11. POTENTIAL ISSUES AFFECTING INITIATION OF FEASIBILITY PHASE

None.

12. VIEWS OF OTHER RESOURCE AGENCIES

Coordination with other resource agencies would be initiated during preparation of the Project Study Plan and would continue during the feasibility phase.


13. PROJECT AREA MAP

A map of the study area is provided as Attachment 1.

14. RECOMMENDATIONS

On the basis of the above findings, I recommend that this Reconnaissance Study be certified as being in accordance with current policy and that a feasibility study be conducted. The estimated feasibility study cost is \$1,340,000 for 53 months. Fannin County, Texas, will be the lead cost-sharing sponsor. A Project Study Plan is currently being developed.

Date 6 September 2000


LEONARDO V. FLOR
Colonel, EN
Commanding